MERRITT
Communications, Inc.
ENVIRONMENTAL SOLUTIONS DIVISION
340 WOODLAND STREET, HOLLISTON, MA 01746-1824, USA

Salem State College

Summary of Current Waste Management and Recycling Program And Recommendations for Increasing Diversion

Prepared for:

The Executive Office of Environmental Affairs

By:

Jennifer Hyde and John Merritt

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Project Basis:

The Massachusetts State Sustainability Program of the Executive Office of Environmental Affairs has funded this project. The first project goal is to examine solid waste and recycling efforts at college and university campuses throughout the State, with respect to meeting the recycling goals waste bans promulgated by MA DEP. Based upon that review, proposals are made for incremental improvement in waste management and recycling practices to increase diversion of materials and reduce disposal in a most cost-effective fashion.

For additional information on the State Sustainability program please contact:

Eric Friedman, Director of State Sustainability, 617-626-1034
Jaclyn Emig, State Sustainability Project Manager, 617-626-4910

Salem State College:

Salem State College's recycling program was resurrected in April of 2003 after a 4-5 year hiatus. The College had stopped recycling for several years due to a difficulty securing a cost effective collection mechanism. In 2002 a library staff employee, a recycling enthusiast, put together a new, all volunteer, pilot, paper collection program. Its success relies on the hard work of the volunteers. However, recycling rates are very low due to the small scope of the program limited by the capacity of the program volunteers.

Summary of Key Recommendations:

1. Develop formal plan of cooperation between recycling program volunteers and the Department of Facilities.

2. Establish active outreach and educational program to make the paper recycling program an active part of public campus life.

3. Double the number of toters used in active collection of office paper from ten to twenty, using toters already received as a grant.

4. Double the collections of full toters from once a month to twice a month, while maintaining the 100% full status upon collection as in the past.

5. To offset the proportional share of estimated additional paper diversion realized at the compactor, reduce the collections from the scheduled 52 per year each to 49 that are at least 95% full, preferably on an on-call basis.

6. To offset the proportional share of estimated additional paper diversion realized at the 10 cu. yd. containers, reduce the collections from the scheduled 156 per year to 147 that are at least 90% full, preferably on an on-call basis.

Summary of Predicted Program Benefits

1. Recycling percentage increases over 300% from 2% to 7% of all material managed.

2. By decreasing the number of collections, there is a resulting one year savings of about $4,000 overall.

Solid Waste Management Practices:

Waste Management Vendor:

JRM Hauling & Recycling
Jim Motzkin, 800-323-4285, Fax -800-808-4916

Contract Start date: 07/01/1999
Contract End date: 06/30/2004 plus two optional one-year extensions

Recycling Vendor:

Save That Stuff, Inc.
Contact: 617-241-9998, fax: 617-241-0294

SSC has a non-binding service agreement with Save That Stuff with a per toter fee of $0/toter if at least ten full toters are collected per pickup.

Equipment, Collection Schedule and Contract costs:

MSW- one -35 cu. yd hydraulic compactor collected weekly (location: North Campus), six - 10 cu. yd top-opening containers collected 3x/week (locations: 2 at North Campus residences, 2 at South Campus residences, 1 at cafeteria and 1at O'Keefe Sports Center)

Lease on compactor is $100/month or $1,200 annually
Disposal fee for tons collected from the compactor is $70/ton.
The collection fee for each collection from the compactor is $100 or $5,200 annually
The collection fee for each collection, per 10 cu. yd container (six total) is $35 or $630 each week and $32,760 annually

Recycling- Eighteen mixed paper collection toters are located in three buildings (library, academic building, and administration building) throughout the campus (purchased with an EOEA grant). Each barrel is assigned to a volunteer "champion" (faculty, staff, and students) who is responsible for delivering the full toter to the library loading dock when full and notifying the volunteer program coordinator, Susan Sturgeon, a library employee, when full. The full toter is replaced by an empty one. The champion returns an empty toter to its location. When 10 full toters have been assembled at the loading dock the program coordinator calls the vendor for pickup usually every four weeks or so. The Facilities Department director reported that the department will be tracking the tonnage, and will transfer avoided costs from trash to pay for barrel purchases, advertising, etc.

Because the volunteers have met the quantity (10 full toters) and purity requirements (80% white office paper) there has been no charge for the current recycling program.

Key Issues to be Addressed:

Salem State's current recycling program is cost effective. The vendor, Save that Stuff, does not charge for collection if 80% of the paper volume collected is office paper and no more than 20% is mixed paper. Since the conception of the program in the Spring of 2003 and the school has not exceeded their mixed paper allowance and the recycling program has not cost the school any funds.

However, their solid waste management contract includes scheduled collections each week, without respect to the percent full containers may be at collection time. As a result, the school is not currently in a position to realize the cost savings of diverting recyclables from their waste stream.

The greatest concerns with Salem State's current program are: the heavy reliance on volunteers, the limited scope of the program due to its volunteer status, and the historic lack of a formal cooperative relationship between program drivers and the facilities department. It appears the possibility of improvement in that last area exists, based on conversations with the facilities director and program participants. The organization and physical labor to implement the program currently relies on one extremely dedicated volunteer. When a plan for ongoing cooperation with the facilities department is established, the program will achieve a fuller recognition on campus as one of the official activities of the school.

It is important to find ways to support the dedication of the current program participants. The primary volunteer leader goes way beyond the responsibilities of her position in the Library. It is an obstacle to long-range program planning and improvement with so much responsibility resting on one volunteer's shoulders. This issue is underlined by her report that she is of retirement age. Her recycling tasks include, but are not limited to:

- Finding and motivating volunteers

- Moving full containers onto the locked loading dock when delivered by champions
- Delivering full containers from their collection site to the loading dock if champion is not available
- Calling vendor when 10 full toters have been assembled for pick up
- Maintaining signage

Additionally, the champions themselves must wheel full toters, which can weigh over 200 pounds from their floor, to the elevators and then to the loading dock. They have to wheel the toters out of doors, up and down elevators, sometimes up or down a step.

To summarize, the issues of greatest concern are:

- Reliance on volunteers
- Physical strain to volunteers of handling toters full of paper
- Limited scope of program
- Lack of formal plan of cooperation with the Facilities Department
- MSW contract not conducive to recycling

Estimates of recycling rates:

Using the available annual waste and recycling tonnage data, the base case estimate shows Salem State College recycling about 18 tons of paper annually, representing a recycling rate of 2%. Based on recent research, paper represent about 31%[1] of the pre-recycling educational institution waste stream. So, SSC is recycling a small fraction of the available paper.

Cost of Existing Recycling Program

The total current cost for the recycling program is the labor and dedication of the volunteer recyclers on campus.

Contract Evaluation:

The school's waste management vendor is JRM Hauling & Recycling.

The first step necessary for SSC to improve their existing program is establishing a formal plan of cooperation between volunteers and the Facilities Dept. Also, a waste management services agreement that offers both unit based pricing and clear reporting of

[1] ***Advancing Resource Management at Fitchburg State College*** (Fitchburg, MA), Tellus Institute for Mass. DEP, January 2002; cites: By weight (before recycling), based on waste stream profiling performed by Harvard University in 2000 and supported by California Integrated Waste Management Board Waste Composition study http://www.ciwmb.ca.gov/WasteChar/BizGrpCp.asp - educational institution data.

material generation and disposed is an important management tool. In addition, an on-call collection basis, rather than scheduled, may allow some reduction in collections necessary or the use of smaller containers. This should result in a reduction in fees.

Since JRM Hauling & Recycling is already one of 35 solid waste services vendors, qualified as contractors under Mass OSD's statewide contract (ST1J391) for waste removal and recycling services, it should be possible for a switch to "on-call" services. Contract ST1J391 requirement #11 requires that: *All contractors must agree to **reduce collection** frequency at department facilities at any time during the agreement period should a facility request such a reduction as a result of greater recycling and/or waste prevention activities. Such reductions in collections should result in associated reductions in price.* It is possible that an on-call collection system would be more cost-effective.

Even if a regularly scheduled collection fee arrangement should continue, if the school receives accurate reports on quantities managed, a reasonable calculation of per ton costs can be established and tracked through potential future changes. Once again, OSD's contract, ST1J391would provide a solution. Requirement #10 requires that: *Contractors must submit **semi-annual statewide reports** to the PMT and must submit individual facility reports upon request which details the quantity of materials disposed of and/or recycled during the previous 6 months*. Since the contracts language does not specify that "weight" be provided, volumes may be the only measure of quantity available. However, if the "on-call" collection approach were adopted and containers were a known percentage full when hauled, reasonable weight estimates can be made from industry volume to weight conversions. If weight slips could actually be negotiated with the vendor, that would be the ideal circumstance. SSC could ask its current vendor if it would be willing to meet the contract requirements of the statewide contract.

In any event, because of the tiny scale of the current program and the relationship with Save That Stuff, the total cost for the recycling program is $0.00, resulting in an average recycling cost of about $0.00/ton.

With respect to solid waste, SSC disposes over 1,000 tons, collected in one 35 cu. Yd. compactor, hauled once a week and six 10-cu. Yd. open top containers, all hauled three times each week. The total cost for solid waste collection and disposal is $74,840, resulting in a per ton cost of about $74for collection and disposal of solid waste.

Recommendations to upgrade current recycling:

MSW:

1. To offset the proportional share of estimated additional paper diversion realized at the compactor, reduce the collections from the scheduled 52 per year each to 49 that are at least 95% full, preferably on an on-call basis.

2. To offset the proportional share of estimated additional paper diversion realized at the 10 cu. yd. containers, reduce the collections from the scheduled 156 per year to 147 that are at least 90% full, preferably on an on-call basis.
3. Amend agreements to provide accurate reporting of material amounts managed, in addition to unit prices for container services. This will allow a more accurate tracking of materials managed and the unit price per ton for each material managed.
4. Carefully review how full all containers are before they are collected to see if a reduced schedule and/or an "on-call" collection approach can be adopted. For a two month trial period, establish a visual tracking system to determine the percent full of containers when collected to better understand the real cost of disposal.

Recycling

1. Develop formal plan of cooperation between recycling program volunteers and the Department of Facilities
2. Establish active outreach and educational program to make the paper recycling program an active part of public campus life.
3. Double the number of toters used in active collection of office paper from ten to twenty, using toters already received as a grant.
4. Double the collections of full toters from once a month to twice a month, while maintaining the 100% full status upon collection as in the past.
5. Increase number of champions. As many volunteers as possible should be recruited to participate in the recycling collection and monitoring program. The Facilities department and existing volunteers could assist with the recruitment effort. The more champions there are, the larger the recycling program can become and the higher the recycling rate will be.
6. Develop official recognition of champions for their role in assisting with the recycling program. In order to incentivize people to become involved with recycling, recycling program duties should be written into participants' job description. The volunteers should be recognized wherever there is an opportunity to mention the valuable contribution that these employees and students are making to campus life and the environment (newsletter, school newspaper, email announcements, assemblies, etc.).
7. Designate a Facilities staff person, work-study student, or other staff person as coordinator of the program with recycling program duties written into their job description. This will alleviate "burn out" of current volunteer coordinator. It is preferable that a Facility employee be assigned the responsibility of overseeing the recycling program to better integrate the Facilities department and the campus recycling activity. If a Facilities staff person is designated, duties should include: 1) Recruiting volunteers; 2) Coordination between volunteers and newly designated Facilities staff who will transport full containers to loading dock; 3) Calling vendor when at least 10 full toters have been assembled for pick up; 4) Keeping records of amount

recycled; 5) Developing recognition program for volunteers; and 6) maintaining signage.

8. Using volunteers to move containers from one building to another and up and down stairs in some cases is unsupportable and could be dangerous. Thus the Facilities Department maintainers who are equipped and insured to handle such work should transport full toters to the loading dock. Volunteers could still be used to wheel full toters to a designated storage location in each building. From there Facilities should drive the full containers to the library loading dock for collection. A small truck with lift gate will need to be used for this purpose
9. If possible designate another loading dock to be used for toter storage. The one at the library is used because of its proximity to the current library program coordinator; however, there may be another loading dock on campus that has easier access and a larger storage area to hold more than 10 toters.
10. Longer term goals for this recycling program include collection of paper deskside to increase diversion rates and utilization of a large dumpster to collect paper to minimize storage issues. However, it is believed by the consultants that these are too large a step to be taken at the current time and should be considered only after the other recommendations have been successfully implemented.

Spreadsheet Tracking Model

The consultants have developed spreadsheet tracking models to assist the school's planning staff in attaining the optimal cost scenario for their existing or planned recycling and solid waste management programs. This tool should prove enormously helpful in assisting schools to make the necessary adjustments in targeted materials, containers, vendors, etc., to achieve the highest possible diversion at the lowest possible cost.

The models works as follows:

The tracking model is an Excel workbook, consisting of three primary worksheets, followed by a series that could be employed to address additional expense or revenue items like amortizing purchased equipment or generating an equipment replacement fund. Any additional expense or revenue issues could be added to this model in the future as required.

The first worksheet includes basic data about the existing program and circumstances, such as the rate of inflation, the densities of different materials and the current revenue per ton for recyclable materials. These assumptions can be changed, if necessary, due to changing circumstances over time. In addition, on the first worksheet, there is an extensive input matrix, with each data input item highlighted in yellow.

This matrix provides spaces to profile current or future container and collection schedules for waste and for recyclables. For each container type, there are input spaces for: # of

containers, the size, collection schedule and known fees for collection, container leases or disposal, percent full when collected.

For the first year, we have attempted to capture, as accurately as the available data allows, what the current circumstances are for all containers for all materials. This column represents the "base case." The power of the model lies in its capacity to allow "what-if" estimates for future years, by varying any of the input variables highlighted in yellow.

Using the data and assumptions described above, the first worksheet calculates the following:

Total waste collection cost
Total waste disposal cost
Total tons of waste disposed
Total recycling cost
Tons of mixed paper recycled
Tons of OCC recycled
Tons of commingled containers recycled
Total waste and recyclable material generation in tons
Recycling percentage
Annual mixed paper revenue
Annual OCC revenue
Annual commingled revenue

The second worksheet of the model is a Budget Summary pro-forma, which takes data from the assumptions and data sheet and breaks out the financial implications of the base case, as well as any what-if scenarios. In addition to restating the total expenses for waste collection and disposal as well as recycling programs, this worksheet breaks out the cost/ton to manage waste, cost/ton to manage recyclable materials and combined cost/ton for all materials. If revenues are relevant, the revenue stream is also captured. Finally, the annual total for all waste and recycling activities is calculated, as is a three-year total.

Therefore, as container sizes, collection schedules or fees are changed, the impact on total recycling percentage, cost, cost/ton for waste and recyclables management can be easily seen. This allows the opportunity to establish hypothetical cases and compare the costs and volumes managed to the current base case. As years pass, the model continues to sharpen each current case, while providing more accurate predictions for possible future cases. When each year has passed, comparing actual results to what had been predicted a year or more earlier allows one to easily assess the degree to which performance expectations have been met or where changes may still be needed. In any event, each campus will have a clear and accurate picture of volumes of materials being diverted and disposed, as well as all costs related to those activities.

Finally, the third worksheet is the summary of the current recycling and waste management contract terms at the school.

Environmental and Cost Benefits of Implementing Recommendations:

1. Increased paper diversion is likely to reduce the amount MSW heading to the landfill or incinerator. This has both a financial and environmental benefit in resource savings (trees, energy, water).
2. There is a savings in landfill capacity, which is at a real premium especially here in Massachusetts. Much MSW is shipped out of state, which has a huge cost both financially and environmentally. By diverting material from the incinerator, results in a net reduction in potentially harmful air emissions
3. The proposed changes result in an estimated increase in recycling rate of over 350 %, rising from 2% to 7% of all material managed.
4. The proposed changes result in an estimated decrease in disposal of about 55 tons, from 1009 to 954 tons.
5. The proposed changes result in an estimated net savings of about $4,000.
6. Base Case - Data interpretation: (***Please refer to Attachment A – Worksheets One & Two***). The current situation or "base case" is reflected in the first column, throughout the model. This column includes all actual annual data available. The total cost of all material management is estimated as $74,840, found on the second worksheet at the bottom of the budget pro-forma. Also found on this worksheet, are the following average "base case" costs: $74.17/ton of MSW managed; $0.00/ton of recyclable materials managed; and $72.86/ton for all materials managed.
7. Year One of proposed changes - Data interpretation: (***Please refer to Attachment A – Worksheets One & Two***). The first year of proposed changes is reflected in the second column, throughout the model. This column includes: a) the reduction of collections of SSC's 10 cu. Yd. waste containers from 156/year to 147/year, on an "on-call" basis when the container is at least 90% full; b) the reduction of collections of SSC's 135 cu. Yd. compactor from 52/year to 49/year, on an "on-call" basis when the container is 100% full; c) doubling active toters for collection from ten to twenty; and d) doubling collections of full toters from once a month to twice a month.

   The total cost of all material management is estimated as $70,834, a reduction from the base case of $4,006. Also found on this worksheet, are the following average "Year one" costs: $74.26/ton of MSW managed and $69.01/ton for all materials managed.

Conclusions:

- Largest immediate benefit would derive from an improved MSW management contract and disposal oversight, which may be achieved by requesting the favorable

terms of the Mass OSD statewide waste management contract (ST1J391) from their current vendor.

- In the current contract environment, where office paper recycling represents no cost, as currently undertaken, the financial incentive is clear to divert more paper and reduce fees devoted to waste collection and disposal.
- The Facilities department should be better integrated into the recycling program management and collection activities so as not to overburden the volunteers and better utilize existing resources.
- There would be a need for outreach and adjustments to in-building collection activities to support paper diversion success.
- The additional savings could be used to support educational outreach and for future upgrades to other paper grades and commingled containers
- An on-call collection system, hauling only very full containers, may add additional savings that might be used to offset additional incremental expense of paper collection infrastructure.